



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,643	04/15/2004	Paul Moroz	071469-0306094 (PC6047A)	7681
Eric Strang Suite 10 4350 W. Chandler Blvd. Chandler, AZ 85226				
7590	05/05/2008		EXAMINER KACKAR, RAM N	
			ART UNIT 1792	PAPER NUMBER
			MAIL DATE 05/05/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/824,643

**Applicant(s)**

MOROZ, PAUL

**Examiner**

Ram N. Kackar

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-31 is/are pending in the application.
- 4a) Of the above claim(s) 25-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 1/22/2008
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Objections***

1. Claim 8 is objected to because of the following informalities: Claim 8 depends upon cancelled claim 2. Appropriate correction is required. For the purpose of this examination it is assumed to depend upon claim 1.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this case the flow control or volume control associated with inlet distribution is not understood. It is noted that if flow from the return side of the thermal assembly is controlled independently of the outlet there will be a back pressure on the thermal assembly. For flow control generally the flow is controlled on the inlet of the thermal assembly which in this case is associated with outlet flow control unit. Further, "volume control" is also not understood in the given context. It is noted that fluid units of the claimed invention as well as prior art have buffering capacity to store fluid volume.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1792

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 4. Claims 1, 3-13, 15-16, 18 and 21-24 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mitrovic et al (WO 03/012567).**

Mitrovic et al discloses a system for controlling the temperature of multiple component surfaces (Abstract) in a processing chamber by circulating heat transfer fluid (Fig 3), first fluid unit (50) and second fluid unit (52) which could be independently temperature controlled where the temperature control is obtained while using temperature sensors (thermocouples 22 and 24 controlling in a feed back loop, the flow of these fluid units in to a mixer (part of outlet flow control unit as in Fig 3-54 and Paras. 22 and 20) before distributing to components. Mitrovic et al further disclose inlet distribution unit to allow the returning fluid to go back to fluid units (Fig 3-56).

***Claim Rejections - 35 USC § 103***

- 5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

- 6. Claims 1, 3-13, 15, 18 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reginald Hunter (US 6026896) in view of Mandrekar et al (US 6117245).**

Reginald Hunter discloses a system for controlling the temperature of multiple components in a processing chamber including substrate holding surface (Col 1 lines 49-54) by circulating heat transfer fluid (Fig 3), first fluid unit and second fluid unit (18 and 54) which could be heated or chilled (Abstract) and where the temperature control is obtained by controlling in a PID feed back loop, the flow of these fluid units controlled and arranged at different temperature (Col 1 line 61-Col 2 line11, Fig 3, Col 3 lines 22-26) while using temperature sensors (Fig 1-36). The use of such a temperature control device is in a processing chamber using CVD, PVD, plasma etching and other processing. Hunter discloses closed loop flow mechanism where the returning fluid comes back to be reused.

Reginald Hunter does not explicitly disclose alternative means of temperature control by mixing fluids of two temperatures in different proportions.

Mandrekar et al discloses a system for controlling the temperature of multiple components in a processing chamber by circulating heat transfer fluid (Fig 2), first fluid unit (50) and second fluid unit (52) which could be heated or cooled and where the temperature control is obtained while using temperature sensors (Abstract) by controlling in a PID feed back loop, the flow of these fluid units in to a mixer (Fig 2-64, Fig 3 and Col 6 lines 11-37) before distributing to components. Regarding the limitation of mixer, Mandrekar discloses that the valve 64 mixes the two flows (Col 6 lines 29-31) in its chamber. Inherently, 64 has several surfaces which help mechanical mixing.

Therefore it would be obvious for one of ordinary skill in the art at the time of invention to have used temperature control by mixing temperature control fluids in different proportion in the apparatus of Hunter to get a system where smooth change of temperature would also be fast.

**7. Claims 1, 3-5, 9-11, 14-16 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaper et al (US 5802856) in view of Mandrekar et al (US 6117245).**

Schaper et al discloses a system for controlling the temperature of a substrate holding surface (Fig 3 and abstract) by circulating heat transfer fluid from plurality of fluid units (64, 66, 68) which could be heated or cooled and where the temperature control is obtained by controlling in a feed back loop, the flow of these fluid units controlled and arranged at different temperature using controller and sensors (Abstract, Fig 5 and 46, 48, 50, 52). Schaper et al further teach finer control of temperature using thermoelectric modules (Abstract). The substrate-holding surface could hold the substrate by electrostatic chuck or vacuum (Col 4 lines 35-40). Schaper et al disclose closed loop flow mechanism where the returning fluid comes back to be reused.

Schaper et al do not explicitly disclose alternative means of temperature control by mixing fluids of two temperatures in different proportions.

Mandrekar et al discloses a system for controlling the temperature of multiple components in a processing chamber by circulating heat transfer fluid (Fig 2), first fluid unit (50) and second fluid unit (52) which could be heated or cooled and where the temperature control is obtained while using temperature sensors (Abstract) by controlling in a PID feed back loop, the flow of these fluid units in to a mixer (Fig 2-64, Fig 3 and Col 6 lines 11-37) before distributing to components.

Therefore it would be obvious for one of ordinary skill in the art at the time of invention to have used temperature control by mixing temperature control fluids in different proportion in

the apparatus of Schaper et al to get a system where smooth change of temperature would also be fast.

**8. Claims 12-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reginald Hunter (US 6026896) in view of Mandrekar et al (US 6117245) as applied to claims (1-13, 15, 18 and 21-24) and further in view of Kanno et al (US Pub 2003/0164226).**

Reginald Hunter in view of Mandrekar et al, as discussed above discloses the use of such a temperature control device in a processing chamber using CVD, PVD and plasma etching but does not explicitly disclose vacuum, RF and lift pins which are normally used in automated processing of semiconductor wafers as disclosed explicitly by Kanno et al (Fig 1- Fig 20).

Therefore using the disclosed temperature control device in an apparatus like disclosed by Kanno et al would have been obvious for precise and uniform temperature control of the substrate for process control and optimization.

**9. Claims 6-8 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Reginald Hunter (US 6026896) in view of Mandrekar et al (US 6117245) as applied to claims (1-13, 15, 18 and 21-24) and further in view of Shultz et al (US 4060997).**

Subject matter of these claims is inherent in the device disclosed by Reginald Hunter; nevertheless Shultz et al disclose a chiller with temperature sensors and fluid level sensors to keep the fluid replenished at constant level for the proper functioning of the heat exchangers. (See Fig 1 and its description).

Therefore subject matter of these claims would have been obvious to one of ordinary skill in the art at the time of invention in order to ensure proper functioning of the heat exchangers.

### ***Response to Arguments***

Applicant's arguments filed 1/18/2008 have been fully considered but they are not persuasive.

Regarding the typographical error in the last office action, the Examiner thanks the Applicant for pointing out the error.

Regarding argument that Mandrekar teaches away from an inlet distribution is not persuasive. Mandrekar is silent about it. However generally all temperature controlling circulators are closed loop since it is not economical to throw the fluid in drain. That is why they are called circulators. Regarding mixer, Mandrekar uses term mixture (Col 6 line 29-31) and Mitrovic (*Included in Information Disclosure Statement*) use the term mixing valve. Absent any structure, other than mixing surface and mixing chamber associated with the mixer, the disclosure reads on the claim.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO



MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ram N Kackar/

Application/Control Number: 10/824,643

Page 9

Art Unit: 1792

Primary Examiner, Art Unit 1792